Questions from Senator Boozman Staff Regarding Illinois River Modeling and EPA Responses
November 1, 2016

Follow up from Meeting with Senator Boozman and Joel Beauvais (Deputy Assistant Administrator of the Office of Water, EPA) and Bill Honker (EPA Region 6 Water Division Director) on September 28, 2016

Question/Statement: Senator Boozman is aware that EPA has been meeting with the "technical work group" representatives from the states and the Cherokee Nation and that there have been extensive discussions among the parties on various aspects of the model inputs and assumptions. However, since the long term implications of the model predictions could result in additional expenditures of millions of dollars (Arkansas has expended $225 million to date), and forced land use changes, as exhibited in recent EPA takings in the Chesapeake Bay TMDL, a number of technical, stakeholder, and implementation specifics remain unanswered or poorly addressed.

EPA Response:
The EPA has appreciated the input of its state and tribal partner agencies, who have provided extensive upfront technical input and comments. At this time, the agency is engaged in collaboratively developing scientifically defensible water quality models for the Illinois River and Lake Tenkiller. These models do not equate to any required expenditures of resources and do not affect any land use decisions. Even if the results of such models were to be incorporated by Arkansas and/or Oklahoma into Total Maximum Daily Loads (TMDLs), which they would submit to the EPA for approval, the TMDLs would not themselves affect such expenditures or decisions. Instead, the states would at that time design plans for implementing the TMDL that best reflect their specific circumstances.

The EPA's model development is still in progress, so we recognize that not all technical, stakeholder, or implementation specifics are fully addressed at this time. At this time, we are intensively engaged in working through such issues with our state and tribal partners before we seek broader input from all stakeholders. We look forward to beginning this broader stakeholder process later in 2016.

Question: When will EPA provide a final list of the changes that will be made to the model prior to release for public comment?

EPA Response:
The agency intends to request public comment on its revised water quality models within the next few months. The EPA provided a summary of the major changes to the models the agency has made thus far, in consultation with the technical workgroup. The primary model changes we have made addressed meteorological data; spatial and temporal application of litter; differences in simulated versus monitored flow, especially in consideration of the drought conditions that existed in parts of 2005-2006; and additional sources of nutrients in the watershed.

Question: Our cities and members of industry have submitted comments to EPA. While EPA has responded to these letters, it is not clear what, if anything EPA will do to address these concerns. Will

EPA have a meeting with these stakeholders to discuss what changes will / will not be made prior to release for public comment?

EPA Response:

EPA will engage with stakeholders as part of the public review and comment process. While the EPA continues collaborating with the technical workgroup to enhance the water quality models for both the Illinois River Watershed and Lake Tenkiller, it is premature to specifically outline how each interested party's concerns about earlier versions of the models have been or will be addressed. However, we look forward to doing so at the appropriate time.

Question: In part, due to the previous issues raised by stakeholders and the failings of the Lake Tenkiller model to accurately predict dissolved oxygen and temperature profiles, EPA elected to separate the lake model from the basin model and is currently working to "calibrate" that model. How does EPA plan to integrate the models and to what extent will the lake model drive waste load allocations in Arkansas?

EPA Response:
The concerns that led to a technical workgroup discussion of separating the models have since been addressed and the Agency is no longer planning a separation of the two models. As to how EPA will integrate the watershed and lake models, the output of the watershed model will become the input to the lake model. Until ongoing efforts to refine the lake model calibration are complete and a range of scenarios is evaluated, it is premature to assess the extent to which the lake model might drive waste load allocations in Arkansas. EPA's goal is to work with the States, Tribe and other parties to develop scientifically defensible information to assist all parties in decision-making for the purpose of restoring water quality in both states.

Question: Your September 13, 2016 letter states "The EPA welcomes all stakeholder comments provided both before and during the upcoming formal public participation process, and continues to be open and transparent regarding our progress in developing the Illinois River Watershed models". It has been over a year since stakeholders have seen anything regarding the internal calibration and validation of the model's operating systems. Since the basin model has been declared "calibrated" and the lake model is in the process of "calibration", one can only assume that EPA believes that the stakeholders will have nothing to add and its work will be done. Please explain how that "continues to be an open and transparent regarding our process in developing the Illinois River Watershed models"

EPA Response:
As stated in EPA's September 13, 2016, letter, the agency looks forward to the upcoming public comment period, which will provide for an opportunity to more fully engage with stakeholders. To date, EPA has focused substantial efforts to engage with the many primary stakeholder agencies in both states, as well as with the Cherokee Nation, which also shares a vested interest in results of the water quality modeling. EPA certainly does not believe that its work is done or that stakeholders will not have additional comments to provide as our work continues.

Question: How does the basin model account for gains and losses of groundwater, both from a volume and nutrient standpoint? This includes septic systems and nutrient movement through the soil column.

EPA Response:
Groundwater loss was explicitly modeled in the watershed model and was addressed as part of the baseflow calibration. Individual septic systems are not expressly modeled. Nutrient movement through the soil is modeled by the fractional allocation of nutrients to surface and upper soil zones and then transported by overland flow and interflow.

Question: EPA's base-run output predicted an approximate 70% reduction in total phosphorus will be needed at the state line to meet the Oklahoma water quality standard. The two states are engaged in discussions in accordance with the "Second Statement of Joint Principles" which could change the frequency and duration of the standard and the assessment methodology. Don't you think that it's premature to be making these predictions given the model uncertainties and lack of stakeholder input?

EPA Response:
As the technical workgroup has discussed, model development need not be delayed by ongoing discussions that may or may not alter the magnitude, frequency, duration, or assessment methodology of the Oklahoma Scenic Rivers Phosphorus water quality standard. Should the EPA-approved water quality standard change as the result of the interstate discussions referenced, the water quality target in the model could be easily modified to reflect the new approved standard.

Question: Several agricultural practices modeled are not actual 'on the ground' practices. When will EPA address the following inaccuracies in the model?

- The model inputs include poultry litter land application five times per year. At most, litter is land applied once per year.

EPA Response:
Data that the EPA has obtained from the Oklahoma Department of Agriculture, Food, and Forestry demonstrates that litter is applied throughout the year. The models' treatment of litter application has been updated to reflect the temporal application practices in the watershed as demonstrated by the data and with agreement with the Technical Workgroup.

Question: The model assumes poultry litter is land applied on soils with < 2% slope. The Natural Resource Conservation Service and Arkansas Natural Resources Commission allow for litter to be land applied on soils up to 15%.

EPA Response:
The agency requested spatial litter application data going back to the start of the project in 2009 and higher resolution spatial litter application data (more resolved than basin scale) from ANRC to be able to more realistically allocate phosphorus contributions given the various slopes in the watershed. ANRC has repeatedly stated that this data is not available to be shared. Nonetheless, given the conservative assumptions made in light of the lack of high resolution litter application

data. the current total phosphorus calibration matches up with the monitored concentrations for the calibration period. It is worth noting that applying litter on higher slope classes will increase littered pastures' modeled contribution of phosphorus to the watershed with an unknown effect on the calibration.

Question: In the model, if a pasture with < 2% slope did not receive litter, it is assumed that commercial fertilizer was used. What is the basis for this assumption?

EPA Response:
Commercial nitrogen fertilizer is applied at 79 lb/ac/yr, based on the assumptions used in the Illinois River Watershed model by Storm and Mittelstet (2014).

Question: How much was invested in the Hydrological Simulation Program--Fortran (HSPF) and Environmental Fluid Dynamics Code (EFDC) models? How much money was invested in each contractor and sub-contractor, and what was the role of each entity?

EPA Response:
EPA has committed between $1.5 and 2 million in extramural resources to engage highly experienced consultants in the development of water quality models. The consultants we have engaged in this effort include AquaTerra, Dynamic Solutions, and Mr. Michael Baker. A breakdown of costs by subcontractor or model is not available at this time.

Question: Your September 13, 2016 letter to me and my colleagues stated "our intent is to provide our partner agencies a set of water quality models supported by a rigorous technical basis for the eventual development of total maximum daily loads". What happened?

EPA Response:
The models have undergone peer review, are currently being reviewed with the technical workgroup and are expected to go out for public comment soon. The process is ongoing, with the next anticipated step being a public comment period.

Question: What constitutes an acceptable TMDL model to the EPA? Given that this TMDL might result in millions to tens of millions of dollars invested into public water utilities to meet the TMDL requirements.

EPA Response:
EPA uses models in numerous circumstances, and courts have upheld EPA's authority to use models in a wide variety of contexts under the Clean Water Act and other laws. We believe that the collaborative stakeholder process we have engaged in with Arkansas, Oklahoma, the Cherokee Nation, and other stakeholders will yield a set of water quality models supported by a rigorous technical basis for the eventual development of total maximum daily loads.

Wooster, Richard

From: Klasen, Matthew
Sent: Tuesday, November 01, 2016 2:25 PM
To: Havard, James; Wall, Tom; Conde, Rosaura; Monschein, Eric; Wooster, Richard
Cc: Peck, Gregory; Orvin, Chris; Honker, William; Gray, David; Best-Wong, Benita; Borum, Denis; Beauvais, Joel
Subject: RE: Follow-ups from Sen. Boozman meeting yesterday
Attachments: 2016-11-01 EPA responses to Sen Boozman IL River modeling questions.pdf

Hi everyone,

For your records, please see attached for the responses we sent back to Senator Boozman's staff as a follow-up to the meeting between Joel, Bill, and others in late September regarding the Illinois River modeling project. Thanks to the OW and R6 folks for developing these responses.

You may also remember that the Senator's office had asked for a response to a precipitation-modeling calibration question more quickly; below is what Denis had previously sent forward on that front. (Thanks Denis!)

Consistent with the discussion during the meeting with the Senator, we've offered to do a call with the Senator's staff at a convenient time for them; I'll let you know if/when I hear back about potential times.

In the meantime, please let me know if we're planning any external announcements about this effort for the near future, so we can figure out how to keep the Senator's office informed as we move forward.

Thanks again,
Matt

Matt Klasen
U.S Environmental Protection Agency
Office of Congressional Affairs
WJC North 3443P
202-566-0780
cell (202) 505-0787

Question:
"It appears that EPA used 2005 – 2006, a very dry year, as the calibration year for the model. When comparing actual loads at that time to modeled loads, the model over predicts by 62% at the state line. What has EPA done to resolve this issue?"

Response:
EPA worked with the technical workgroup, including applying a strategy that Dr. Brian Haggard of the University of Arkansas recommended, to address concerns regarding monitored vs. modeled concentrations of total phosphorus at the state line during the drought years. An over-prediction in the modeled concentrations at the state line for total phosphorus has been addressed by augmenting flow in reaches well above the state line. The modeled low flows now align with the monitored flows during the drought period. Specifically, the watershed model now predicts the average modeled load of total phosphorus for 2005-2006 to be 99% of the monitored load from the USGS gage 07195430 at the state line.

Matthew; Wooster, Richard
morrow's meeting

ses (see the attached document). I recommend we note that
aff.

ure talking points we shared earlier today (which I copy below

ling Illinois River:

; River Watershed and Lake Tenkiller has
is November). This has been a deliberate,
multiple agencies in both Oklahoma and
ın. Our efforts to date have aimed at
)proaches for developing these models.

we have convened four meetings with
; to discuss and work through detailed
their reviews of the modeling reports.

ally defensible and publically
elopment of these models.

d Tribe, EPA has also been responsive to
nd looks forward to a more full engagement
fall. As we have indicated in our response to
ernments and industrial representatives, the
he technical workgroup are closely aligned
oy outside stakeholders.